

CLIENT LIAISON

clear formulation of owner's expectations, functional requirements, constraints, and budget

SPACE ARRANGEMENTS

cargo
tankage
machinery space layout
public spaces
crew spaces
overnight accommodations
viewing and entertaining
access arrangements and details
galley / stores / food prep

HULL FORM

monohulls
multi-hulls
3-D lines fairing

HYDROSTATICS

weights and moments
curves of form
intact stability analysis
damaged stability analysis
floodable length
tankage

HYDRODYNAMICS

resistance
wake and thrust deduction estimation
speed vs power analysis
systematic series propeller calculations
propulsor selection and optimization
vessel motions in a seaway (prediction of roll, pitch, heave, slamming, etc)
maneuvering analysis
rudder and appendage design

STRUCTURAL ANALYSIS

longitudinal hull girder bending and shear
plating: shell, decks, bulkheads, tanks
framing
appendages
masts, rigging
classification society scantling rule compliance
first principles analytical methods

STRUCTURAL LAYOUT AND DETAILS

steel structure
aluminum structure
composite structure (GRP, etc)
welding and fastenings

PROPULSION MACHINERY

propulsor selection and sizing
shafting selection and layout
prime mover comparison, selection, and sizing
reduction gear selection and sizing
foundation arrangement and details

MACHINERY PLANT ARRANGEMENT

engines, gears, shafting
steering gear
thrusters
waterjets
pumps
generators
batteries
auxiliary machinery

THERMODYNAMICS

heat/energy balance
fuel utilization studies
thermal insulation
exhaust gas trajectory
heating, ventilation, air conditioning (HVAC)

HABITABILITY

crew and passenger comfort
noise and vibration attenuation
pilothouse ergonomics
helmsman's range of view
access for mobility impaired persons
safety features

OUTFITTING

- deck machinery layout
- hydraulic machinery installations
- cargo handling gear installations
- mooring, towing, anchor handling arrangements
- lifesaving equipment arrangements
- ramps, hatches, means of access
- waste handling systems (blackwater, greywater, trash disposal)
- joiner system materials and layout

PIPING SYSTEMS

- cargo
- fuel
- engine cooling
- water ballast
- bilge
- RSW
- potable water
- sanitary, greywater, blackwater
- steam
- hydraulic
- lube oil
- exhaust
- fire protection

ELECTRICAL

- electrical load analysis
- one line diagrams
- lighting

ECONOMICS

- construction cost estimates
- life-cycle cost estimates
- measures of merit (rate of return on investment, required freight rate, etc.)
- comparative trade-off studies for competing vessel designs
- comparative trade-off studies for selected vessel features

STYLING

- exterior
- joiner materials